Societies and Academies.

LONDON.

Geological Society, December 21, 1921.—Mr. R. D. Oldham, president, in the chair.—H. B. **Milner**: The nature and origin of the Pliocene deposits of the County of Cornwall and their bearing on the Pliocene geography of the south-west of England. Tertiary deposits of Cornwall at St. Agnes, St. Erth, Lelant Downs, Polcrebo, and St. Keverne have been provisionally assigned to the Pliocene period; except those of St. Erth, all are unfossiliferous. The average composition of the St. Agnes, St. Erth, and St. Keverne deposits is substantially the same. On this basis correlation of the deposits is effected by (*a*) the frequency of occurrence of individual species, (*b*) their persistence or distribution, and (*c*) the constancy of crystallographical, physical, and optical properties of grains of the same mineral, wherever met. The source of the material is essentially local. The gradual "swamping" of sediment-bearing rivers by the advancing Pliocene sea from the south-west is correlated with certain physical features apparent, especially the "400-ft. plateau."—L. **Owen**: The phosphate deposit of Ocean Island. Ocean Island, in the Western Pacific Ocean, consists of a mass of terraced and dolomitised coral-limestone which rises to a height of 300 ft. above low water, spring tide. Its surface is almost completely covered by a capping of calcium phosphate of exceptional purity which can be divided into three varieties: (*a*) Amorphous calcium phosphate, formed of the insoluble residue of the original guano; (*b*) detrital coral-limestone, converted into calcium phosphate by solutions leached from the guano; and (*c*) phosphatised coral *in situ*. The percentage of tricalcium phosphate at any point varies in a remarkably regular manner, according to the position of the point on the island, suggesting that (*a*) the original guano was deposited on the coral base during a slow negative movement of the strand-line, and (*b*) subsequent to the formation of phosphate the island was tilted at about a third of a degree south-south-eastwards.

EDINBURGH.

Royal Society, December 5, 1921.—Prof. J. W. Gregory, vice-president, in the chair.—Prof. **Jehu**: Observations on the geology of Iona. The Archæan complex of the western and greater part of Iona consists mainly of orthogneisses of dominant acid and hornblendic types, although pyroxene-hornblende gneiss and garnetiferous pyroxene granulites also occur. Paragneisses of various kinds are found at isolated localities as lenticular masses in the orthogneisses. On the south coast the forsterite-tremolite marble (Iona marble) is associated with hornfelsed green rocks, some of which are altered sediments and some altered igneous rocks. The paragneisses are younger than, and unconformable to, the orthogneisses, and represent remnants of pre-Torridonian rocks which became infolded with the orthogneisses. A massive white pegmatite forms a prominent feature in the landscape from the marble quarry on the south coast to near the centre of the island. A belt of Torridonian beds lying unconformably on the Archæan forms the eastern margin of the island, and consists of a lower group of epidotic conglomerates and grits and an upper group of finer grits, slates, shales, and banded flags. The Torridonian series of Iona may be correlated with the lower parts of the Diabaig group of that series in Skye and other districts. In post-Torridonian time the Archæan and Torridonian rocks have been subjected to isoclinal folding, the Archæan series being dragged more or less into approximate parallelism with the Torridonian. Along the line of junction there has been considerable crushing, but no actual thrust. The Torridonian rocks show dynamic metamorphism, and the later intrusion of the Ross of Mull granite has resulted in a later thermal metamorphism. This granite forms three small islets close to the south-east shore, and probably underlies the southern half of Iona. A series of genetically connected minor intrusions occur, and, with the granite, belong probably to the Caledonian phase of igneous activity.—H. M. **Cadell**: The geology of the Blackness district. Recent borings for oil-shale and coal in the Blackness district south of the Firth of Forth have not disclosed much mineral wealth, but have provided a complete vertical section of the Oil-Shale series in that region, indicating a notable attenuation of the whole shale section towards the north and west. To the west of Blackness no workable oil-shale was found above the Burdiehouse Limestone, although the positions of the seams were recognisable. The borings were continued westward up to the Bo'ness coal-seams of the Carboniferous Limestone series through ground that had never been previously explored. Six distinct beds of limestone had been found varying much in thickness from place to place. The No. 5 limestone measuring from the top downwards appeared from its fauna to be the equivalent of the Blackhall Limestone of the West of Scotland. The old volcano of Binns Hill to the south of Blackness belonged to the volcanic horizon situated near the top of the oil-shale section between the Two Feet Coal and the overlying Raeburn Shale seam. There had been much boring and mining for shale under the east end of the hill, and the evidence showed that within a few hundred yards of the thick ash on the hill there was no ash under the Raeburn Shale where it was to be expected. Binns Hill had been a very small volcano, one of a group that emitted showers of ash after the formation of the Houston and Two Feet Coal seams over a district extending southward about seven miles. Under the whole district and below the Burdiehouse Limestone there was a large intrusive basalt sill, and Binns Hill and other small local ash-necks seem to have acted as geological safety-valves by which imprisoned gases escaped and blew up part of the fluid eruptive rock in the form of fine dust and ashes.

PARIS.

Academy of Sciences, December 27, 1921.—M. Georges Lemoine in the chair.—The president announced the death of Prof. Schwarz, correspondant for the section of geometry.—E. **Borel**: Quasi-analytical functions with real variables.—W. **Kilian**: A problem of the tectonic of the sub-Alpine chains of Dauphiné.—C. E. **Guillaume**: Recent fundamental determinations and verifications of the standard metres. Slight elongations in the lengths of the working standard metres of the International Bureau have been proved. The cause of the change is not clear, but is possibly due to the effects of cleaning. Recent determinations of the coefficients of expansion of the bars have proved a small error in the opposite direction, and at the present time these errors compensate each other at about 15° C.—M. **Gevrey**: The determination of the integrals of partial differential equations, order $2p$, and m variables, admitting a multiple family of characteristics of order p.—G. **Bertrand**: Fredholm's equation and static masses of the first kind.—M. **d'Azambuja**: A mode of graphical representation of the filaments of the upper layer of the solar chromosphere.—J. **Villey**: The adiabatic liquefaction of fluids.

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In a recent communication M. Bruhat has deduced from thermodynamical reasoning that the heat of vaporisation of a liquid at the absolute zero tends to a limiting value, not zero, and also that an adiabatic expansion sufficiently extended should always result in liquefaction. These conclusions have been objected to by M. Ariès. The author now shows that on the basis of the kinetic theory M. Bruhat's results are probable.—L. **de Broglie**: The theory of the absorption of the X-rays by matter and the principle of correspondence.—A. **Dauvillier**: Contribution to the study of the structure of the elements of intermediate atomic weight.—E. **Carvallo**: The problem of relativity in dielectrics.—R. **Boulouch**: The problem of achromatism.—H. **Pélabon**: The constitution of selenium. Different specimens of grey selenium are regarded as mixtures in variable proportions of two modifications, α and β, the α modification having a high resistance, the β a low resistance. The change in the specific resistance with temperature shows that the α changes into the β modification with absorption of heat. It is the α-selenium which is sensitive to light.—C. **Staehling**: The radio-activity of the uranium oxides. The changes in the radio-activity of the green oxides of uranium are attributed to the slow absorption of moisture; the black, strongly ignited oxide has a constant radio-activity, and is not hydrated on standing.—P. **Woog**: Relations between molecular properties and the capacity of fixing iodine of certain hydrocarbons.—M. **Samec** and V. **Ssajevič**: The composition of agar.—A. **Schoep**: Kasolite, a new radio-active mineral. The mineral was found at Kasolo, Belgian Congo, and occurs along with curite and chalcolite. It contains lead and uranium, and analysis gives the composition as

$$3PbO\cdot3UO_3\cdot3SiO_2\cdot4H_2O.$$

—H. **Hubert**: New researches on the storm squalls in western Africa.—A. **Petit**: The cytology of two bacteria.—L. **Daniel**: New researches on grafts of Helianthus. An account of further experiments of grafting sunflowers on Jerusalem artichokes, with special reference to the weights of the tubers.—L. **Emberger**: Contribution to the cytological study of the sporangium in ferns.—M. **Boel**: The automatic adaptation of the angle of attack of flight in living insects. Study on the mechanism of natural flight.—M. **Nicloux** and G. **Welter**: The gravimetric quantitative micro-analysis of urea. Application to the estimation of urea in 1 c.c. of blood. The urea is precipitated as xanthylurea, and weighed on a Kuhlmann balance to 0·001 milligram.—E. **Aubel**: The attack of glucose and levulose by the pyocyanic bacillus. Glucose gave formic and acetic acids, with some ethyl alcohol. Levulose gave the same products, together with lactic acid.—E. **Chatton** and A. **Lwoff**: A new family of Acinetians, Sphenophryidæ, adapted to the branchia of the acephalous molluscs.—P. **Courmont**, A. **Rochaix**, and F. **Laupin**: The rhythm of the disappearance of ammonia in the course of the purification of sewage by activated sludge.—A. **Lumière**: The mechanism of the accidents caused by the injection of the serum of epileptics.—L. **Blum**: The antiphlogistic action of calcium salts.

Official Publications Received.

Office scientifique et technique des Pêches Maritimes. Notes et Mémoires No. 10: Le Controle Sanitaire de l'Ostréiculture. Par Dr. G. Borne, F. Diénert, et G. Hinard. No. 11: Le Conseil International pour l'Exploration de la Mer. Compte rendu Sommaire de la Session tenue à Copenhague, Juillet, 1921. (Paris: Ed. Blondel la Rougery.)

University of Illinois: Engineering Experiment Station. Bulletin No. 124: An Investigation of the Fatigue of Metals. By Prof. H. F. Moore and J. B. Kommers. Pp. 185. (Urbana: University of Illinois.) 95 cents.

Report on the Administration of the Meteorological Department of the Government of India in 1920-21. Pp. 14+1 chart. (Simla.) 4 annas.

Department of Fisheries, Bengal and Bihar and Orissa. Bulletin No. 17: Statistics of Fish Imported into Calcutta for the Year ending 31st March, 1921. Pp. ii+13. (Calcutta: Bengal Secretariat Book Depôt.) 8 annas.

Department of Agriculture, Madras. Bulletin No. 80: The Entomologist's Crop Pest Calendar for the Madras Presidency. By T. V. Ramakrishna Ayyar. Pp. 4+4 plates. (Madras: Director of Agriculture.) 2 annas.

The Marine Biological Station at Port Erin (Isle of Man). Being the Thirty-fifth Annual Report of the former Liverpool Marine Biology Committee, now the Oceanography Department of the University of Liverpool. (Read before the Liverpool Biological Society, November 11, 1921). Drawn up by Prof. J. Johnstone. Pp. 36. (Liverpool: University Press.)

Notes from the Royal Botanic Garden, Edinburgh. Vol. 6. Additional Plate Number. Addition to Numbers 29-30 (January, 1917). Plates 1-37. 2*s*. net. Vol. 13. No. 62. Pp. 67-100+plates 170-179. 1*s*. 6*d*. net. (Edinburgh: H.M. Stationery Office.)

Transactions of the Royal Society of Edinburgh. Vol. 53, part 1 (No. 3): Geological Observations in the South Shetlands, the Palmer Archipelago, and Graham Island, Antarctica. By D. Ferguson. Pp. 29-56+plates 1-4. 6*s*. 6*d*. Vol. 53, part 1 (No. 4): A Contribution to the Petrography of the South Shetland Islands, the Palmer Archipelago, and the Danco Land Coast, Graham Land, Antarctica. By G. W. Tyrrell. Pp. 57-80.—Vol. 53, part 1 (No. 5): On the Innes Wilson Collection of Rocks and Minerals from the South Shetland Islands and Trinity Island. By Dr. H. H. Thomas. Pp. 81-90. 1*s*. 6*d*. (Edinburgh: R. Grant & Son; London: Williams & Norgate.)

Diary of Societies.

THURSDAY, JANUARY 12.

ROYAL AERONAUTICAL SOCIETY (Juvenile Lecture) (at Royal Society of Arts), at 3.—Major D. C. H. Hume: Boats that Fly.

LONDON MATHEMATICAL SOCIETY (at Royal Astronomical Society), at 5.—J. E. Campbell: Einstein's Theory of Gravitation as an Hypothesis in Differential Geometry (II).—Miss G. D. Sadd: Rational Plane Curves.—Fritz Lettenmeyer: Neuer Beweis des allgemeinen Kroneckerschen Approximationssatzes.—T. Carleman: A Theorem Concerning Fourier's Series.—T. Stuart: Parametric Solutions of Certain Diophantine Equations.—W. P. Milne: Apolarity and the Weddle Surface.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—Exhibition of Cinematograph Films.—P. Torchio, with explanatory notes by Dr. C. C. Garrard: Investigations and Tests on High-tension Switchgear.—F. Gill: Telephone Inventors of To-day.—F. Gill: The Audion.—F Gill: Electricity in the Home.

OIL AND COLOUR CHEMISTS' ASSOCIATION (at Food Reform Club, 2 Furnival Street, E.C.), at 7.30.—A. H. Keable: Super Centrifugal Force and its Application to the Clarification of Varnish and Dehydration of Oil.

OPTICAL SOCIETY (at Imperial College of Science and Technology), at 7.30.—Dr. C. J. Peddle: The Manufacture of Optical Glass.—Dr. J. W. French: The Barr and Stroud 100 ft. Self-contained Base Rangefinder.—T. Smith: The Optical Three Apertures Problem.

INSTITUTE OF METALS (London Section) (at Sir John Cass Technical Institute), at 8—Col. N. Belaiew: The Inner Structure of the Crystalline Grain.

HARVEIAN SOCIETY (Annual General Meeting) (at 11 Chandos Street. W.1), at 8.15.—Dr. G. de Bec Turtle: Some Points on Spasm in the Alimentary Tract (Presidential Address).

ROYAL SOCIETY OF MEDICINE (Neurology Section), at 8.30.—Sir Frederick Mott and Dr. Uno: Changes in the Brain in Cases of Surgical Shock.

SOCIETY OF ANTIQUARIES, at 8.30.

FRIDAY, JANUARY 13.

ROYAL ASTRONOMICAL SOCIETY, at 5.—J. S. Paraskévopoulos: Jupiter in 1915 and 1916: Rotation Period in Different Latitudes, from Observations at the National Observatory, Athens.—Prof. G. Forbes: Solar Motion from 1922 Radial Velocities.—Major W. J. S. Lockyer: The Use of a Graduated Wedge in Stellar Classification and Parallax Work.

ROYAL SOCIETY OF MEDICINE (Clinical Section), at 5.

JUNIOR INSTITUTION OF ENGINEERS, at 8.—E. C. West: Artificial Ice.

ROYAL SOCIETY OF MEDICINE (Ophthalmology Section), at 8.30.—M. L. Hepburn: Experience Gained from 150 Trephine Operations for Glaucoma.—H. Neame: Epibulbar Leucoma with Intraocular Involvement.

MONDAY, JANUARY 16

ROYAL GEOGRAPHICAL SOCIETY (at Lowther Lodge, Kensington Gore), at 5.—O. J. S. Crawford: The Archæology of the Ordnance Survey Maps.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Sir Arthur Keith: Hunterian Lecture.

SOCIETY OF CHEMICAL INDUSTRY (London Section) (at Chemical Society), at 8.—E. H. Richards and G. C. Sawyer: Further Experiments with Activated Sludge.

ARISTOTELIAN SOCIETY (at University of London Club, 21 Gower Street), at 8.—H. J. Paton: Plato's Theory of εἰκασία.

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